

East African Medical Journal Vol: 93 No. 10 (Supplement) October 2016

AN ASSESSMENT OF WATER, SANITATION AND HYGIENE (WASH) PRACTICES AND QUALITY OF ROUTINELY COLLECTED DATA IN MACHAKOS COUNTY KENYA

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ABSTRACT

**Background:** Poor water, sanitation, and hygiene (WASH) practices, predispose to childhood morbidity and mortality globally, and especially from diarrhoeal diseases. Machakos County in its community strategy utilises Community Health Workers (CHWs) to promote WASH practices and to collect household based data using a structured reporting tool. There is no published data on WASH in Machakos County.

**Objectives:** To assess (i) WASH practices, and (ii) completeness and accuracy of routinely collected data on household water, sanitation and hygiene with reported childhood diarrhoea cases of all community units in Machakos County, Kenya.

**Design:** Descriptive ecological study

**Setting:** Machakos County, Kenya

**Subjects:** Household units

**Results:** A total of 137,540 households were served by the CHWs between January and December 2014. The number of households was not updated as per ministry of health recommendation, after six months hence the denominator remained constant. There was a high uptake of households with treated drinking water (92%), availability of hand washing facilities in (89%) and availability of functional pit latrines (98%). A total of 4,012 diarrhoea cases were reported in the County, with an average of 90 cases every month, except in the month of August where 3,020 cases of diarrhoea were reported. There was no apparent relationship observed between WASH practices and occurrence of under five diarrhoea cases.

**Conclusion:** Water, sanitation and hygiene practices at community level in Machakos County are in keeping with post 2015 WASH targets and indicators, with few cases of under-five diarrhoea reported. Data quality and completeness need to be addressed for effective programme evaluation.

INTRODUCTION

Poor water, sanitation and hygiene (WASH) practices, predispose to childhood morbidity and mortality globally, and especially from diarrhoeal diseases (1). Each year, over 1.7 billion cases of diarrhoea occur in children under the age of five, with Africa and Asia accounting for over half of these cases (2).

The under-five mortality rate in Kenya is 52/1000 live births, with diarrhoeal diseases being one of the main cause of mortality (3). Increasingly, public health emphasis is on WASH promotion at

community level, and has been shown to significantly reduce diarrhoeal cases in children, and averting complications related to early childhood development (4-6). Community Health Workers (CHWs) who are lay persons trained on preventive, promotive and basic curative services, contribute to a reduction of diarrhoeal cases (4, 7). From 2006, the Kenya Ministry of Health has strengthened utilisation of CHWs to collect household based data using a structured reporting tool. However, no formal evaluation has been conducted to assess the WASH practices, and the quality of routinely collected data. Effective health service delivery depends on complete and accurate

flow of data to the central repository(8). Quality of data is fundamental for evidence based decision-making to improve service delivery (4, 9)

We therefore assessed the WASH practices, and completeness and accuracy of routinely collected data on household water, sanitation and hygiene with reported childhood diarrhoea cases of all community units in Machakos County, Kenya.

## MATERIALS AND METHODS

*Study Design:* This was an ecological study, a description using routinely collected Programme data from the District Health Information System 2 (DHIS2) database for Machakos County, 2014.

*Setting:* The study was carried out in Machakos County which is situated to the west of Nairobi. Machakos County has a largely rural populace, who are mainly subsistence farmers with over 60% of them living below poverty line (10). It has a hilly terrain, which is largely arid and semi-arid and lies between 1000 to 2100 meters above sea level. Its sources of water are rivers, shallow wells, boreholes and rain water. The population is estimated to be about 1.2 million. There are 264,500 households, out of which about 50% are covered by 1,300 CHWs with 138 community health units. The CHWs are supervised by 138 Community Health Extension Workers (CHEWs). The same households are surveyed each month. CHWs collect data from households on daily basis using a structured reporting tool. The community strategy guidelines recommend an update of the number of households every six months(11).

### *Operational Definition of Terms.*

*Community Health Unit:* This is a village with an approximate population of 5000 people.

*Household:* This is a family unit with a family head who is either a man or woman or both with children feeding from the same pot.

*Treated drinking water:* Water treatment is done using chlorine in form of aqua-tabs or water guard provided

by CHWs. When they are out of stock, the households are encouraged to purchase from local shops.

*Hand washing facilities:* These comprises of soap and running water from a leaky tin or tap.

*Functional pit latrine:* A household with a functional pit latrine that is used by all its members.

*Cases of childhood diarrhoea:* Passage of loose stool three times or more in 24 hours. Loose stool takes the shape of the container.

*Data collection and analysis:* Data variables included the proportion of households without treated drinking water, hand washing facilities, functional pit latrines and cases of reported diarrhoea among children under the age of five in Machakos County. Every month, the CHWs collect data which is entered in DHIS2 by health information officers. All data is verified for completeness and accuracy by the CHEWs. Data were exported from DHIS2 into Ms Excel for analysis. The number of households without treated drinking water, hand washing facilities and functional pit latrines were presented as proportions as well as absolute numbers. The cases of childhood diarrhoea were related to poor hygiene and sanitation for each month, from January to December 2014.

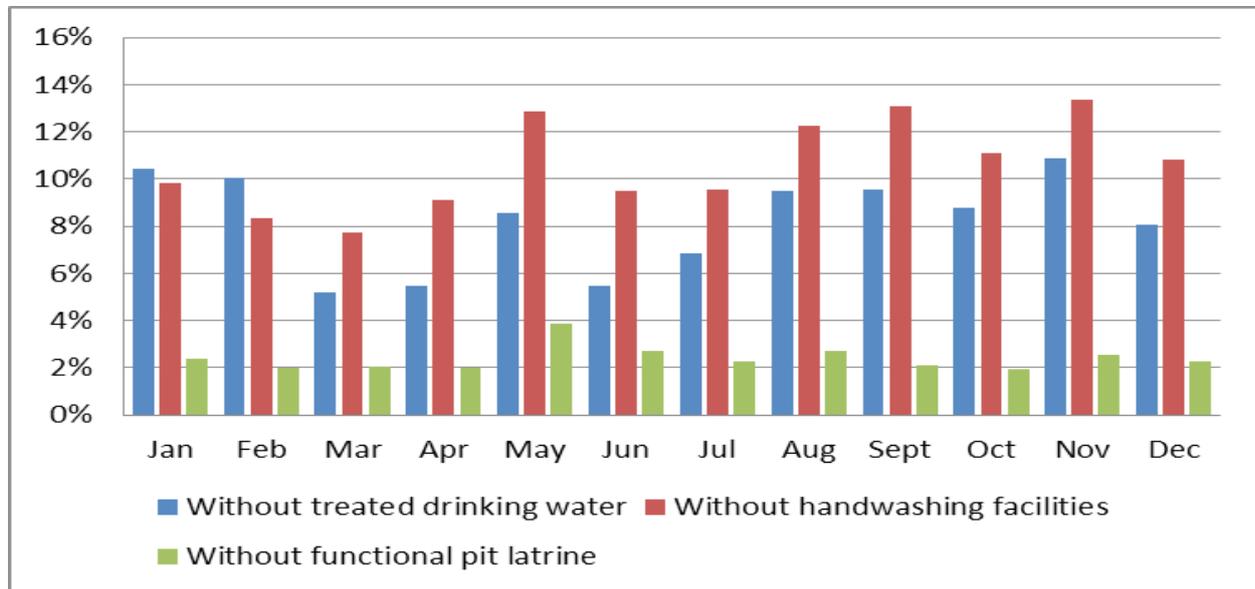
*Ethical Considerations:* Formal ethics approval was granted by the Institutional Research Ethics Committee (IREC) of Moi University/ Moi Teaching and Referral Hospital, Eldoret, Kenya and the Ethics Review Board of Médecins Sans Frontières, Luxembourg. Permission was obtained from the Ministry of Health and Machakos County. Informed consent was not necessary as only aggregated County data was used for this analysis.

## RESULTS

A total of 137,540 households were served by the community health workers between January and December 2014. The number of households was not updated as per recommendation after six months. On average, 8% of the households used untreated drinking water, 11% had no hand washing facilities and 2% of the households had no functional pit latrine. Figure 1 shows variations in WASH practices over the calendar year.

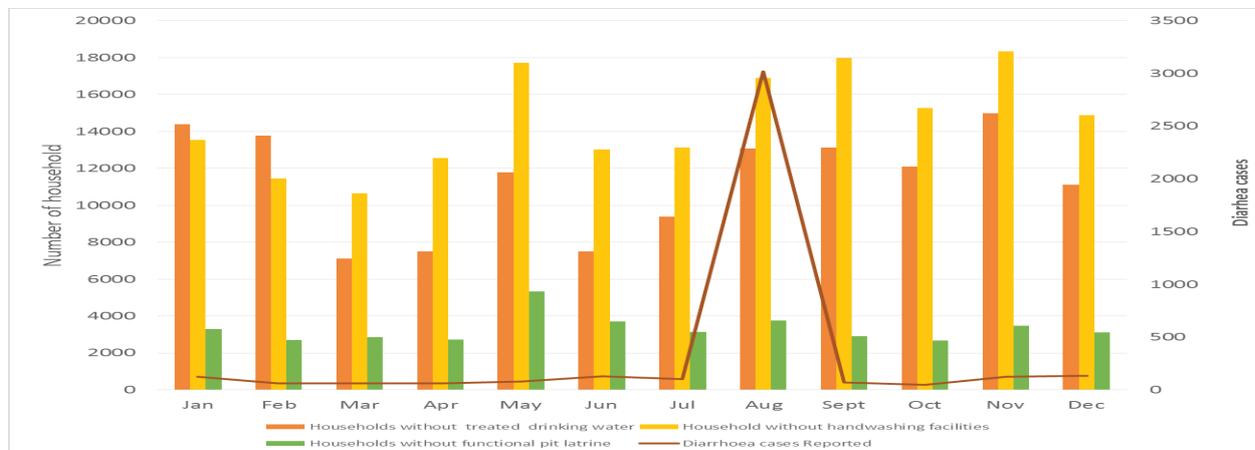
**Figure 1**

*Proportion of households served by community health workers without treated drinking water, hand washing facilities and functional pit latrines in Machakos County, Kenya.*



**Figure 2**

*Hygiene, sanitation and occurrence of childhood diarrhoea cases reported in Machakos county, Kenya.*



A total of 4,012 diarrhoea cases were reported in Machakos County in 2014. An average of 90 cases of childhood diarrhoea was reported every month, except in the month of August where 3,020 cases of diarrhoea were reported. There is no apparent relationship observed between WASH practices and occurrence of childhood diarrhoea cases (Figure2).

**DISCUSSION**

This study shows that water, sanitation and hygiene practices at community level in Machakos County are in keeping with international targets. Except in the month of August, few cases of diarrhoea among children under the age of five were observed and no relationship was noted between WASH practices and cases of diarrhoea. Post 2015 WASH targets and indicators are: by 2025 no one practices open defecation; by 2030, everyone uses a basic drinking water supply and handwashing facilities and by 2040,

everyone uses adequate sanitation(12).

The low numbers of childhood diarrhoea cases reported for the period under review, can be attributed to a high uptake of treated drinking water (92%), availability of hand washing facilities in (89%) and availability of functional pit latrines (98%). The few cases of diarrhoea which occurred could also be associated with other causes including underreporting by CHWs, which this study did not investigate. The study could not also establish the reasons for the high number of diarrhoea cases in the month of August,

but an outbreak or data quality cannot be ruled out. A lapse in data quality and completeness was noted, household numbers were not updated at six months as per the recommendations, hence a possibly affecting the denominator (11).

There are no published studies done in Machakos County, however studies done in Turkana Kenya, demonstrated that sanitation and hygiene promotion at community level, significantly led to reduction of diarrhoea in children(4). In another study done Western Kenya, the findings showed that children living in households with improved toilet facilities have a 30% lower chance of developing diarrhoea, than those in non-improved toilet facilities(13). Hence these results compare well with other studies.

This being a retrospective study from routine data, issues of data quality may arise. Despite this limitation, the study has a number of strengths. This being a County wide study, the results are most likely representative of the situation in Machakos County, and probably the rest of the other counties in Kenya, where community health strategy is being implemented. The study was based on community health workers actual distribution in the county and therefore no methodological biases. Lastly, the study adhered to STROBE Guidelines(14).

From a policy perspective, these findings point to a need to discuss the success of community health strategy both at national and county levels. These data can be used for emergency disease surveillance response within the community. There is need for advocating and promoting improved hand washing practices as well as improving modalities for data quality and completeness together with data utilisation for decision making. Finally measures should be put in place to offer continuous refresher training for CHWs and their supervisors.

## CONCLUSION

Water, sanitation and hygiene practices at community level in Machakos County meet are in keeping with post 2015 WASH targets and indicators, with few cases of under-five diarrhoea reported. Data quality and completeness need to be addressed for effective programme evaluation.

## FUNDING/ ACKNOWLEDGEMENT STATEMENT

This research was conducted through the Structured Operational Research and Training Initiative (SORT IT), a global partnership led by UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR) based at the World Health Organization. The model is based on a course developed jointly by the International Union Against Tuberculosis and Lung Disease (The

Union) and Médecins sans Frontières (MSFOCB). The specific SORT IT Programme which resulted in this publication was led by the Department of Obstetrics and Gynaecology, University of Nairobi and the Kenya Ministry of Health Department of Disease Prevention and Control.

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